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ABSTRACT

Results of a study to analyze factors affecting critical reading are reported. The factors are readability of textual material, pupil intelligence, and motivation. Passages from U.S. history textbooks, a critical reading and literal comprehension test, and a standard measure of student motivation were administered to 207 senior high school students in a medium-sized rural public school in Texas. Passages from the textbooks treated the same topic, but were written at a different level according to the Fry Readability Graph. Critical reading comprehension results indicated that readability was not a statistically significant factor, students with high motivation to learn were more successful with critical reading skills, and intelligence was a significant factor. Literal comprehension results showed that students tested on the easiest to read material had higher literal comprehension scores than those tested on medium to low readability materials; students with high motivation to learn were more successful than those with low motivation; and students with above average intelligence had significantly higher scores than those with average or low intelligence. Further research should address factors that theoretically affect the critical readability of textual passages, and should determine the extent to which variables measured in this study are related to textual materials in other content fields. (Author/KC)

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The Influence of Readability of Text, Motivation, and Intelligence on Critical Reading Comprehension of Secondary Social Studies Students

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Introduction

According to Bormuth (1973), reading researchers historically have concerned themselves with a theoretical discussion of reading in terms of specific skills (e.g., vocabulary development, phonic and structural analysis). This attention has focused primarily upon literal comprehension and word recognition skills and secondarily upon critical or creative reading.

Noting this emphasis upon literal comprehension and word recognition skills, several important questions immediately arise. Is reading a series of skills that allows the reader to parrot back the printed page with a certain degree of accuracy? Or, does good reading equate with locating specific information within the context? Or, is "good reading", like thinking, an expansive activity that is effected by many personal and environmental factors? Everyone professionally concerned with reading agrees that it is a complex process. Because of its complexity, increased investigation appears necessary in order to understand the entire process.

Purpose of the Study

The purpose of this study was to contribute to the clarification of the expansive activity referred to in the literature as the critical reading process. This study analyzed certain factors that were believed to affect critical reading.

A review of the literature in reading reveals that certain factors clearly affect a pupil's ability to read at the literal comprehension

level. Those elements most commonly referred to are intelligence, motivation, and the readability of textual material. Nevertheless, current research is limited in scope. The available research is inconclusive. Moreover, research in critical reading is nearly non-existant.

As earlier stated, intelligence, motivation, and readability affect a pupil's ability to read at the literal level. On the other hand, their possible relationships to critical reading have not been studied. Thus, the basic question of this researdh study is: does readability of textual material and pupil intelligence and motivation effect secondary school pupils' critical reading of social studies text?

Procedures

In an effort to answer the basic research question, experimental materials were administered to, and data collected from, 207 randomly selected 9th, 10th, and 11th grade students. These students were enrolled in nine U.S. History classes in a medium sized rural public school system in central Texas.

Experimental materials were randomly assigned to these 207 subjects. These materials included a textual passage taken from one of three commonly adopted U.S. History textbooks. Each passage treated the same topic, the U.S. Constitutional Convention, but each was judged, using the Fry Readability Graph (1966), to be written at a strikingly different readability level. Also included in the experimental materials were a researcher-developed criterion test and a standard measure of student motivation to learn (JIM Scale, Frymier, 1965). The criterion test had two parts: one dealing with critical reading comprehension and the other literal comprehension. These materials were administered by a team of advanced graduate students during one regularly scheduled class period. Intelligence quotient (total IQ) scores from the California Achievement Test were secured from the subjects' cumulative folders.

All data were collected during the Spring, 1978.

Data Analysis

Analysis of variance was the statistical treatment of choice. The experimental design employed was a 3 (readability level) x 3 (IQ level) x 2 (motivational level) analysis of variance. The initial analysis was followed by an analysis of covariance to adjust critical reading scores for IQ scores in a 3 (readability level) x 2 (motivational level) with IQ score as covariant. Similar analyses were conducted for the secondary hypotheses dealing with literal comprehension scores.

The second set of analyses tested the effect of motivation on the dependent variables of literal comprehension and critical comprehension. Here, one-way analysis of variance was employed.

Post-hoc analyses of obtained significant F-ratios were conducted using the Scheffe test (Kerlinger, 1973).

Major Findings

Here, the major findings of this study are stated. This presentation lists the findings as they relate to the research hypotheses.

Critical Reading Comprehension

1. Readability was not statistically significant as a factor affecting students' ability to read critically.

2. Students with high motivation to learn in school were more successful to a statistically significant degree in dealing with critical reading skills than were students with low motivation.

3. Intelligence was statistically significant as a factor affecting the critical reading ability of students.

4. Students with above-average intelligence (IQ) had statistically significant higher critical reading criterion scores than did students with average or below-average IQ. Students with average intelligence had significantly higher critical reading scores than did students with below-average intelligence.

5. No statistically significant interactions were observed.

6. When intelligence as a factor was covaried against critical reading criterion scores neither readability nor motivation as factors were significant.

Literal Comprehension

1. The effects on literal comprehension of the three independent variables (readability, motivation, and intelligence) were all statistically significant at the .001 level.

2. Students tested on the easiest to read material had statistically higher literal comprehension criterion scores than did students tested on the medium readability/reading ease or low readability/reading ease material. Students encountering medium readability/reading ease material achieved higher literal reading scores than did students encourntering the low readability/reading ease material.

3. Students with high motivation to learn in school were significantly more successful in dealing with literal comprehension test items than were students with low motivation.

4. Students with above-average intelligence (IQ) had statistically significant higher literal comprehension scores than did students with average or below-average IQ. Students with an average IQ achieved higher literal reading scores than did students with a below-average IQ.

5. No statistically significant interactions of main effects were observed.

Significance

This study provides empirical support to the immense body of literature including Aukerman (1972), Davis (1976), Karlin (1972), Kennedy (1974), Pearson (1978), and Spache (1976), that compares critical reading with higher-order cognitive skills. This study is a first. It gives direction for further research and provides justification for further inquiry into the factors that affect the higher-order mental process called critical reading.

Suggestions for Further Research

Results of this research indicate a number of directions toward which further inquiry might be directed. The following are some problems appearing to merit additional research.

Increased theoretical attention to the condept of critical reading must be undertaken. It can be undertaken in league with research, but it should receive prior attention.

Since this is one of the very few studies focusing on readability and critical reading, this investigation should be replicated and extended. Too, previously stated limitations might be accounted for. Close attention should be given to the identification of specific critical reading skills that can, or should be taught. An extension of this study using an intervention strategy should be productive. In that situation a group of subjects who have been instructed in the critical thinking skills being tested (e.g., identifying a relationship inherent in an analogy, identifying non-examples, etc.) would be contrasted to another group with no prior instruction in the accomplishing of critical thinking skills.

The need is clear for extensive research on factors that theoretically affect the "critical readability" of textual passages. This present study indicates that current instruments designed to predict readability of text may not be adequate for the prediction of "critical readability." Further research should be directed toward an understanding of what impact certain stylistic, syntactic, and vocabulary factors might have on higher-order mental processes. A study using controlled passages (passages specifically written to control various "readability" factors) would be helpful in identifying those specific variables which might affect a reader's ability to read critically.

Extensive research may also be necessary to determine the extent to which the variables measured in this study are related to textual materials in other content fields. Prior to any generalization about their effect on the total process of critical reading, additional studies are required in other curricular areas and school levels.

Table 1

Passages Dealing With the Constitutional Convention
Selected for the Testing Situation

Title of Text	Publishers	Readability Grade Level
"History: USA"	American Book Company	College
"Rise of the American Nation"	Harcourt-Brace-Jovanovich	9
"A High School History of Modern America"	Laidlaw Brothers	5

Table 2

Means and Standard Deviations of Critical Reading and Literal Comprehension Scores

Level	N	Critical		Literal	
		Mean	S.D.	Mean	S.D.
Readability					
High	70	3.686	1.774	5.643	1.888
Medium	70	3.529	1.709	5.186	2.241
Low	67	3.836	1.864	4.508	2.156
Motivation					
High	100	4.100	1.795	5.710	2.086
Low	107	3.290	1.677	4.570	2.051
Intelligence					
Above-Average	23	5.652	1.584	7.652	1.112
Average	164	3.652	1.553	5.018	1.977
Below-Average	20	1.650	1.268	3.050	1.538
Total	207	3.681		5.121	

Table 3

Summary of Analysis of Variance of Selected Critical Reading Skills

Source	df	Sum of Squares	Mean Square	F	Significance
Main Effects					
Readability	2	5.293	2.646	1.130	.325 (n/s)
Motivation	1	14.846	14.846	6.341	.01
Intelligence	2	153.987	76.993	32.884	.001
Two-Way Interactions					
Motivation - IQ	2	2.102	1.051	.449	.639 (n/s)
Motivation - Readability	2	3.067	1.534	.655	.521 (n/s)
IQ - Readability	4	4.320	1.080	.461	.764 (n/s)
Three-Way Interaction					
Motivation - IQ - Readability	2	1.830	.915	.391	.677 (n/s)
Residual	191	447.198	2.341		

Table 4

Summary of Analysis of Covariance on Selected Critical Reading Skills Scores with IQ Score as Covariate

Source	df	Sum of Squares	Mean Square	F	Significance
Main Effects					
Readability	2	7.889	3.944	1.827	.164 (n/s)
Motivation	1	3.461	3.461	1.603	.207 (n/s)
Two-Way Interaction					
Motivation - Readability	2	1.962	.981	.454	.635 (n/s)
Residual	200	431.706	2.159		

Table 5

Summary of Analysis of Variance of Literal Comprehension Criterion Scores

Source	df	Sum of Squares	Mean Square	F	Significance
Main Effects					
Readability	2	44.820	22.410	7.283	.001
Motivation	1	35.323	35.323	11.479	.001
Intelligence	2	201.432	100.716	32.729	.001
Two-Way Interactions					
Motivation - IQ	2	16.400	8.200	2.665	.072 (n/s)
Motivation - Readability	2	2.205	1.103	.358	.699 (n/s)
IQ - Readability	4	23.415	5.854	1.902	.112 (n/s)
Three-Way Interaction					
Motivation - IQ - Readability	2	4.366	2.183	.709	.493 (n/s)
Residual	191	587.752	3.077		

REFERENCES

Allen, Jack and John L. Betts, History: USA, New York: American Book Co., 1972, pp. 101-105.

Allport, Gordon, Becoming, New Haven: Yale University Press, 1955.

Anastasi, Anne, Psychological Testing (4th ed.), New York: MacMillan, Co., 1976.

Athey, Irene, "Reading Research in the Affective Domain," In Harry Singer and Robert B. Ruddell (eds.) Theoretical Models and Processes of Reading, Newark, Del.: IRA, 1976, pp. 352-373.

Aukerman, Robert C., Reading in the Secondary School Classroom, New York: McGraw-Hill Book Co., 1972.

Alston, W.C., Philosophy of Language, Englewoods Cliffs: Prentice-Hall, 1964.

Bauer, E.B., "The Interrelatedness of Personality and Achievement in Reading," an unpublished dissertation, University of California at Berkeley, 1956.

Betts, Emmett A. "Research on Reading as a Thinking Process," Journal of Educational Research, 50, 1956, pp. 1-15.

Bloom, Benjamin S., Taxonomy of Educational Objectives: Cognitive Domain, New York: David McKay Co., 1956.

Bond, Guy L. and Eva Bond Wagner, Teaching the Child to Read (3rd ed.), New York: MacMillan, Co., 1960.

Bormuth, John R. "Readability: A New Approach," Reading Research Quarterly, 1, 1966, pp. 79-132.

Bormuth, John R. "Reading Literacy: Its Definition," Reading Research Quarterly, 9, 1973-74, pp. 7-66.

Burmeister, Lou E., Reading Strategies for Secondary School Teachers, Reading, Ma.: Addision-Wesley Publishing Co., 1976.

Cardinell, C.F. "Rewriting Social Studies Materials to Lower Reading Levels," The Reading Teacher, 30, 1976, pp. 168-172.

Carter, P., Jr., "A Descriptive Analysis of the Adult Adjustment of Persons Once Identified as Disabled Readers," an unpublished dissertation, Indiana University, 1964.

Coleman, E.B. "Developing a Technology of Written Instruction: Some Determiners of the Complexity of Prose," In E.Z. Rothkoph and P.E. Johnson (eds.) Verbal Learning Research and the Technology of Written Instruction, New York: Columbia University Teachers College Press, 1971, pp. 155-204.

Combs, Arthur W. and Donald Snygg, Individual Behavior, New York: Harper & Brothers, 1959.

Crossen, Helen J. "Effects of Attitudes of the Reader Upon Critical Reading Ability," Journal of Educational Research, 42, 1948, pp. 289-298.

Dale, Edgar "The Critical Reader," The News Letter, 30, January 1965, pp. 1-4.

Davis, E. Dale, Teaching Reading in the Secondary School, Dubuque, Iowa: Kendall Hunt Publishing Co., 1976.

Dechant, Emerald, Reading Improvement in the Secondary School, Englewood Cliffs: Prentice-Hall, 1973.

Eller, William and Judith Goldman Wolf, "Factors in Critical Reading," In Eric L. Thurston (ed.) The Philosophical and Sociological Basis of Reading, Fourteenth Yearbook of the National Reading Conference, Milwaukee, Wis.: National Reading Center, 1965, pp. 64-72.

Ennis, R.H., "A Concept of Critical Thinking: A Proposed Basis for Research in the Teaching and Evaluation of Critical Thinking Ability," In B. Paul Komisar and C.J.B. MacMillan (eds.) Psychological Concepts in Education, Chicago: Rand MacNally, 1967, pp. 114-118.

Feely, Ted, "Critical Thinking: Toward a Definition, Paradigm and Research Agenda," Theory and Research in Social Education, 4, August 1976, pp. 1-19.

Fromm, Erich, Escape From Freedom, New York: Farrar and Rinehart, Inc., 1941.

Fry, Edward B., "A Readability Formula that Saves Time," Journal of Reading, 11, 1966, p. 513.

Fry, Edward B., "The Readability Graph Validated at Primary Levels," The Reading Teacher, 22, 1969, p. 535.

Frymier, Jack R., JIM Scale Student Questionnaire, Columbus: Ohio State University Press, 1965.

Frymier, Jack R., "Development and Validation of a Motivation Index," Theory into Practice, 9, February 1970, pp. 56-88.

Gans, Roma, A Study of Critical Reading Comprehension in the Intermediate Grades, New York: Columbia University Teacher College Press, 1940.

Gates, A.I., "The Role of Personality and Maladjustment in Reading Disability," Journal of Genetic Psychology, 59, 1941, pp. 77-83.

Glaser, E.M., An Experiment in the Development of Critical Thinking, New York: Columbia University Teachers College Press, 1941.

Glazer, Susan Mandel, "Is Sentence Length a Valid Measure of Difficulty in Reading Formulas?," The Reading Teacher, 27, February 1974, pp. 1-4.

Granowsky, Alvin and Morton Botel, "Background for a New Syntactic Complexity Formula," The Reading Teacher, 28, 1974, pp. 31-35.

Granzow, K.R., "A Comparative Study of Underachievers, Normal Achievers, and Overachievers in Reading," an unpublished dissertation, Iowa State University, 1954.

Groff, Patrick J., "Children's Attitudes Toward Reading and Their Critical Reading Abilities in Four Content-Type Areas," Journal of Educational Research, 55, April 1962, pp. 313-319.

Harris, Albert J., "Some New Developments on Readability," New Horizons in Reading, International Reading Association Proceedings, 1974, pp. 333-339.

Horn, Ernest, Methods of Instruction in the Social Studies, New York: Charles Scribner's Sons, 1937.

Hovland, C.I., The Order of Presentation in Persuasion, New Haven: Yale University Press, 1957.

Huey, E.B., The Psychology and Pedagogy of Reading, New York: MacMillan, 1908.

Huus, Helen, "Critical and Creative Reading," Reading and Inquiry, International Reading Association Proceedings, 1964, pp. 115-117.

Karlin, Robert, Teaching Reading in High School, New York: Bobbs-Merrill Co., 1972.

Kennedy, Eddie C., Methods in Teaching Developmental Reading, Itasca, Ill.: F.E. Peacock Publishers, Inc. 1974.

Kerlinger, Fred N., Foundations of Behavioral Research, (2nd. ed.), New York: Holt, Rinehart & Winston, Inc., 1973.

King, Martha L., Bernice D. Ellinger, and Willavene Wolf (eds.) Critical Reading, New York: J.P. Lippincott Co., 1967.

Kennedy, Eddie C., Methods in Teaching Developmental Reading, Itasca, Ill.: F.E. Peacock Publishers, Inc., 1974.

Klare, George R., "Assessing Readability," Reading Research Quarterly, 10, 1974-75, pp. 62-102.

Kurth, R.J., Evaluation of an Objective-Based Curriculum in Word Attack, Madison: Wisconsin Research and Development Center for Cognitive Learning, 1975.

Kurth, R.J. and Patricia A. Moseley, "The Influence of Readability on Critical Reading Skills," A paper presented at the annual meeting of the American Educational Research Association, New York, 1977.

Maslow, Abraham, Motivation and Personality, New York: Harper and Brothers, 1954.

Marksheffel, Ned D., Better Reading in the Secondary School, New York: Ronald Press Co., 1966.

Mathewson, Grover C., "The Function of Attitude in the Reading Process," In Harry Singer and Robert B. Ruddell (eds.), Theoretical Models and Processes of Reading, Newark, Del." IRA, 1976.

MacGinitie, Walter and Richard Tretiak, "Sentence Depth Measures," Reading Research Quarterly, 6, 1971, pp. 364-376.

Miller, William, "Factors in Reading Difficulty: A Readability Analysis of World History Textbooks," an unpublished dissertation, The University of Texas at Austin.

Nie, Norman, C. Hadlai Hull, Jean G. Jenkins, Karin Steinbrenner, and Dale H. Brent, SPSS - Statistical Package for the Social Sciences, New York: McGraw-Hill Book Co., 1975.

Oliver, Donald W. and James P. Shaver, Teaching Public Issues in the High School, Boston: Houghton-Mifflin, Co., 1966.

Otto, Wayne, Nathaniel A. Peters, and Charles W. Peters, Reading Problems: A Multidisciplinary Perspective, Reading, Ma.: Addison-Wesley Publishing Co., 1977.

Pearson, P. David, "The Effects of Grammatical Complexity on Children's Comprehension, Recall, and Conception of Certain Semantic Relations," Reading Research Quarterly, 10, 1974-75, pp. 155-192.

Pearson, P. David and Dale D. Johnson, Teaching Reading Comprehension, New York: Holt, Rinehart & Winston, 1978.

Pietras, P., "Teaching High School Literature: A Reading Skills Approach," English Journal, 65, September 1976, pp. 44-47.

Pingry, Robert E., "Critical Thinking -- What Is It?", The Mathematics Teacher, November 1951, pp. 466-467.

Provus, M., "Teaching Critical Thinking Through History," School Review, 63, October 1950, pp. 393-396.

Robinson, Helen M., "Developing Critical Readers," In Martha L. King (ed.), Critical Reading, New York: J.B. Lippincott Co., 1964, pp. 35-45.

Rothkopf, E. and E. Bisbicos, "Selective Facilitative Effects of Interspersed Questions on Learning from Written Materials," Journal of Educational Psychology, 58, 1967, pp. 56-61.

Russell, David H., Children Learn to Read, New York: Ginn & Company, 1949.

Sanders, Norris M., Classroom Questions: What Kinds?, New York: Harper & Row, 1966.

Schneyer, J. Wesley, "Significant Reading Research at the Secondary School Level," Perspectives in Reading, Newark, Del: IRA, 1964.

Shafer, Boyd C., Everett Augspurger, Richard A. McLemore, and Milton Finkelstein, A High School History of Modern America, River Forest, Ill.: Laidlaw Brothers Publishers, 1977, pp. 107-111.

Simmons, John S., "Reasoning Through Reading," Journal of Reading, 8, April 1965, pp. 311-314.

Smith, B. Othanel, "The Improvement of Critical Thinking," Progressive Education, 30, March 1953, pp. 129-134.

Smith, Frank, Understanding Reading: A Psycholinguistic Analysis of Reading and Learning to Read, (2nd. ed.), New York: Holt, Rinehart, & Winston, 1977.

Smith, Henry P. and Emerald V. Dechant, Psychology in Teaching Reading, Englewood Cliffs: Prentice-Hall, Inc., 1961.

Sochor, E. Elona, "Literal and Critical Reading in the Social Studies," In Martha L. King (ed.), Critical Reading, New York: J.B. Lippincott Co., 1964, pp. 348-361.

Sochor, E. Elona, "The Nature of Critical Reading," Elementary English, 31, January 1959, pp. 129-134.

Spache, George and Evelyn B. Spache, Reading in the Elementary School, (3rd. ed.), Boston: Allyn and Bacon, Inc., 1976.

Stauffer, Russell G. (comp.), Dimensions of Critical Reading, Proceedings of the Annual Educational and Reading Conferences, 11, Newark, Del.: University of Deleware Press, 1964.

Stauffer, Russell G., Teaching Reading as a Thinking Process, New York: Harper & Row Publishers, 1969.

Stauffer, Russell G., "Cognitive Processes Fundamental to Reading Instruction," In J. Guthrie (ed.), Cognition, Curriculum, Comprehension, Newark, Del.: IRA, 1977.

Tinker, Miles and Constance M. McCullough, Teaching Elementary Reading, (2nd. ed.), New York: Appleton-Century-Crofts, Inc., 1962.

Thorndike, E.L., "Reading As Reasoning: A Study of Mistakes in Paragraph Reading," Journal of Educational Psychology, 8, 1917, pp. 323-332.

Todd, Lewis and Merle Curti, Rise of the American Nation, New York: Harcourt Brace Jovanovich, 1977, pp. 137-141.

Vaughan, Joseph L., "Interpreting Readability Assessments," Journal of Reading, 19, May 1976, p. 638.

Wolf, Willavene, "The Logical Dimension of Critical Reading," Reading and Inquiry, 10, IRA Proceedings, 1965, pp. 121-124.

Wolf, Willavene, Charlotte S. Huck, and Martha L. King, Critical Reading Ability of Elementary School Children, Columbus: Ohio State University Research Foundation, 1967.

Yamamoto, Kaoru, "Threshold of Intelligence in Academic Achievement of Highly Creative Students," Journal of Experimental Education; 32, 1964, pp. 401-405.

Yoakam, Gerald A., Reading and Study, New York: MacMillan Company, 1930.

Yoakam, Gerald A., Basal Reading Instruction, New York: McGraw-Hill Book Co., 1955.